WHAT IS CLAIMED IS:

1. A data transmission method for transmitting and receiving a transmission signal between a plurality of data transmission apparatuses interconnected via transmission paths in a ring configuration, the transmission signal being based on data processed according to a predetermined communication protocol, the method comprising:

generating, in a physical layer of a first data transmission apparatus, reception data in response to a transmission signal outputted from an immediately upstream data transmission apparatus, generating a transmission signal based on the reception data, and outputting the transmission signal to an immediately downstream data transmission apparatus, the first data transmission apparatus being at least one of the plurality of data transmission apparatuses;

generating, in a physical layer of a second data transmission apparatus, reception data in response to a transmission signal outputted from an immediately upstream data transmission apparatus, and processing the reception data in a link layer of the second data transmission apparatus according to the communication protocol, the second data transmission apparatus being the rest of the plurality of data transmission apparatuses other than the first data transmission apparatus; and

processing transmission data in the link layer of the

second data transmission apparatus according to the communication protocol, generating a transmission signal in the physical layer of the second data transmission apparatus based on the transmission data, and outputting the transmission signal to an immediately downstream data transmission apparatus.

2. The data transmission method according to claim 1, wherein the first data transmission apparatus transmits and receives the transmission signal in accordance with an instruction from an outside of its own physical layer, in a manner such that the reception data bypasses its own link layer.

3. The data transmission method according to claim 1, wherein the first data transmission apparatus transmits and receives the transmission signal by maintaining its own link layer in a reset state where a data process operation is suspended, so that the reception data bypasses the link layer.

4. The data transmission method according to claim 3, further comprising at the time of initialization for allowing the plurality of data transmission apparatuses in which both of the link layer and the physical layer are in the reset state to perform transmission/reception of a transmission signal therebetween;

causing the link layer and the physical layer of the second data transmission apparatus to exit the reset state; and

causing only the physical layer of the first data transmission apparatus to exit the reset state.

5. The data transmission method according to claim 1, wherein:

the transmission signal is generated in the physical layer by mapping symbols of the transmission data to any of a plurality of signal levels; and

the reception data are generated in the physical layer based on evaluation levels for distinguishing and evaluating each signal level of the transmission signal.

6. The data transmission method according to claim 1, wherein the communication protocol is defined by MOST (Media Oriented Systems Transport).

7. A data transmission system having a plurality of data transmission apparatuses interconnected with each other via transmission paths in a ring configuration, the data transmission apparatuses transmitting and receiving a transmission signal therebetween, wherein the data transmission apparatuses each comprise:

a processing section for processing transmission/reception data according to a predetermined communication protocol; and

a transmitting/receiving section for generating a transmission signal based on the transmission data processed in the processing section and outputting the transmission signal to an immediately downstream data transmission apparatus, and for generating reception data based on a transmission signal outputted from an immediately upstream data transmission apparatus and outputting the reception data to the processing section,

wherein:

a first data transmission apparatus generates reception data in the transmitting/receiving section based on a transmission signal outputted from an immediately upstream data transmission apparatus, generates a transmission signal based on the reception data, and outputs the transmission signal to an immediately downstream data transmission apparatus, the first data transmission apparatus being at least one of the plurality of data transmission apparatuses;

a second data transmission apparatus, which is the rest of the plurality of data transmission apparatuses other than the first data transmission apparatus, generates reception data in the transmitting/receiving section in response to a transmission signal outputted from an immediately upstream data transmission apparatus, and processes the reception data in the processing section according to the communication protocol; and

the second data transmission apparatus processes transmission data in the processing section according to the

communication protocol, generates a transmission signal in the transmitting/receiving section based on the transmission data, and outputs the transmission signal to an immediately downstream data transmission apparatus.

8. The data transmission system according to claim 7, wherein the transmitting/receiving section comprises:

a bypass path for outputting the reception data by bypassing its own processing section; and

a selector for selecting one of the transmission data and the reception data in accordance with an operating condition of the processing section and outputting selected data to a transmitting end of the transmitting/receiving section, the transmission data outputted from the processing section and the reception data outputted through the bypass path, wherein

the selector of the first data transmission apparatus selects the reception data outputted through the bypass path, in accordance with an instruction from an outside of its own transmitting/receiving section.

9. The data transmission system according to claim 7, wherein the transmitting/receiving section comprises:

a bypass path for outputting the reception data by bypassing its own processing section; and

a selector for selecting one of the transmission data

and the reception data in accordance with an operating condition of the processing section and outputting selected data to a transmitting end of the transmitting/receiving section, the transmission data being outputted from the processing section and the reception data being outputted through the bypass path, wherein

the selector of the first data transmission apparatus selects the reception data outputted through the bypass path, when the processing section of the first data transmission apparatus is in a reset state where a data processing operation is suspended.

10. The data transmission system according to claim 9, wherein the data transmission apparatuses each further comprises

a control section for controlling operations of its own processing section and its own transmitting/receiving section, wherein

the control section of the first data transmission apparatus controls the processing section of the first data transmission apparatus so as to maintain its reset state.

11. The data transmission system according to claim 10, further comprising transmission lines for communicably interconnecting the control sections of the respective data transmission apparatuses, wherein

the control section of the first data transmission apparatus controls the processing section of the first data

transmission apparatus so as to maintain its reset state, in accordance with an instruction inputted through the transmission line.

12. The data transmission system according to claim 7, wherein the transmitting/receiving section comprises:

a data mapping section for generating the transmission signal by mapping symbols of the transmission data to any of a plurality of signal levels; and

an evaluation processing section for generating the reception data based on evaluation levels for distinguishing and evaluating each signal level of the transmission signal.

13. The data transmission system according to claim 7, wherein the communication protocol used in the processing section is defined by MOST (Media Oriented Systems Transport).

14. A data transmission apparatus interconnected with other data transmission apparatuses via transmission paths in a ring configuration and performing transmission/reception of a transmission signal with the other data transmission apparatuses, the data transmission apparatus comprising:

a processing section for processing transmission/reception data according to a predetermined communication protocol; and

a transmitting/receiving section for generating a transmission signal based on transmission data processed in the processing section and outputting the transmission signal to another data transmission apparatus, and for generating reception data based on a transmission signal outputted from another data transmission apparatus and outputting the reception data to the processing section,

wherein:

in a first mode, the transmitting/receiving section generates reception data based on a transmission signal outputted from another data transmission apparatus, generates a transmission signal based on the reception data, and outputs the transmission signal to another data transmission apparatus;

in a second mode different from the first mode,

the transmitting/receiving section generates reception data in response to a transmission signal outputted from another data transmission apparatus and outputs the reception data to the processing section;

the processing section processes the reception data outputted from the transmitting/receiving section, according to the communication protocol, and outputs to the transmitting/receiving section transmission data processed according to the communication protocol; and

the transmitting/receiving section generates a transmission signal based on the transmission data outputted from

the processing section and outputs the transmission signal to another data transmission apparatus.

15. The data transmission apparatus according to claim 14, wherein the transmitting/receiving section comprises:

a bypass path for outputting the reception data by bypassing the processing section; and

a selector for selecting one of the transmission data and the reception data in accordance with an operating condition of the processing section and outputting selected data to a transmitting end of the transmitting/receiving section, the transmission data outputted from the processing section and the reception data outputted through the bypass path, wherein

the selector selects the reception data outputted through the bypass path, in accordance with an instruction indicating the first mode and received from an outside of the transmitting/receiving section.

16. The data transmission apparatus according to claim 14, wherein the transmitting/receiving section comprises:

a bypass path for outputting the reception data by bypassing the processing section; and

a selector for selecting one of the transmission data and the reception data in accordance with an operating condition of the processing section and outputting selected data to a

transmitting end of the transmitting/receiving section, the transmission data outputted from the processing section and the reception data outputted through the bypass path, wherein

the selector selects the reception data outputted through the bypass path, when, in the first mode, the processing section is in a reset state where a data processing operation is suspended.

17. The data transmission apparatus according to claim 16, further comprising a control section for controlling operations of the processing section and the transmitting/receiving section, wherein

the control section controls, in the first mode, the processing section so as to maintain its reset state.

18. The data transmission apparatus according to claim 17, further comprising a transmission line for communicably connecting the control section to another data transmission apparatus, wherein

the control section controls the processing section so as to maintain its reset state, in accordance with an instruction indicating the first mode and inputted through the transmission line.

19. The data transmission apparatus according to

claim 14, wherein the transmitting/receiving section comprises:

a data mapping section for generating the transmission signal by mapping symbols of the transmission data to any of a plurality of signal levels; and

an evaluation processing section for generating the reception data based on evaluation levels for distinguishing and evaluating each signal level of the transmission signal.

20. The data transmission apparatus according to claim 14, wherein the communication protocol used in the processing section is defined by MOST (Media Oriented Systems Transport).